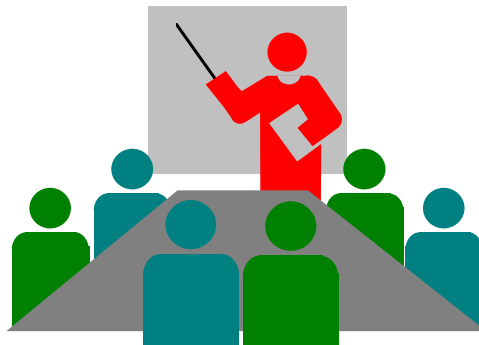


SPACE & NAVAL WARFARE SYSTEMS CENTER SAN DIEGO

SOFTWARE ENGINEERING TRAINING PLAN

PL-TP-01 v2.7
October 1, 2002



Systems Engineering Process Office, Code 212
Space and Naval Warfare Systems Center, San Diego
53560 Hull Street
San Diego CA 92152-5001

Approved for public release; distribution is unlimited

RECORD OF CHANGES

***A** - ADDED **M** - MODIFIED **D** - DELETED

VERSION NUMBER	DATE	NUMBER OF FIGURE, TABLE OR PARAGRAPH	A * M D	TITLE OR BRIEF DESCRIPTION	CHANGE REQUEST NUMBER
1.0	2/16/98			Original SSC SAN DIEGO Training Plan	SETP-0001
2.0	9/10/98	All	M	New Title: SSC San Diego Software Engineering Training Plan Paragraphs and Appendices reordered	
2.1	9/24/98	All	M	All parts edited and updated	
2.2	3/3/99			Internal working copy – not released	
2.3	9/23/99	Sec 6, Sec 7, Sec 8, Sec 9	D	Sec 6 (Course Development and Acquisition Procedure), Sec. 7 (Student Selection and Enrollment Procedures), Sec 8 (Course Delivery Standards), and Sec 9 (Training Evaluation and Tracking Procedures) transferred to Training Program Process	
		Sec 6, Sec 7	A	Sec 6 (FY2000 Training Needs Analysis and Schedule, Sec 7 (FY2000 Training Resource Requirements) added	
		Other sections	M	Editing updates	
2.4	5/1/2000	Section 5	A	Team Training course added	
		Appendix B	D	Appendix B (Department/Project Training Plans) transferred to Training Process	
		Appendix C, D	A	Appendix C (SPI Agent Training Plan) and Appendix D (Instructor Training Plan) added	
		All	M	Incorporate comments from Formal Inspection of April 4, 2000	
2.5	9/1/2000	Sec 5	A	Waiver options added to courses	
		All	M	Updated plans and schedules for FY2001	
2.6	10/1/2001	Appendix A	A	CMM Level 4 and 5 requirements added	
		Sec 5.1	M	Change Software Management for Executives workshop to Software Management for Everyone; delete SPIRIT course; add High-Maturity Processes	
		All	M	Updated plans and schedules for FY2002	
2.7	10/1/02	All	M	Updated plans and schedules for FY2003. Add descriptions for 4 Just-In-time courses.	

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SECTION 1. SCOPE

Software engineering training is intended to develop the skills and knowledge of individuals to expand the core expertise of SPAWAR Systems Center San Diego (SSC San Diego) to develop, implement, and support integrated information systems; and to develop the professional excellence of employees to perform their roles more effectively and efficiently.

Training is an organizational responsibility, but the software projects are responsible for identifying their needed skills and providing the necessary training when the project's needs are unique.

1.1 Purpose

The purpose of this Software Engineering Training Plan is to document decisions and to gain consensus on the direction of the Type II (SEPO-provided) training needed to meet the SSC San Diego training objectives. Version 2.7 updates the plan for the Government's Fiscal Year 2003 (FY2003).

1.2 Software Personnel Categories

This training plan applies to all SSC San Diego software-dependent projects and to the following categories of SSC San Diego personnel:

- a. **Executive Board.** The Commanding Officer, Executive Director, and Department Heads.
- b. **Senior Manager** - Department Head, Division Head, or Branch Head responsible for software-dependent projects. This category also may include sponsors from System Commands and other customer organizations.
- c. **Software Project Manager** - The person ultimately responsible for the delivery of technically-compliant work products within the resource and schedule constraints established in a software development plan. The software project manager is an experienced practitioner and team leader and directs the work of product engineering teams as well as that of support staff engaged in planning, monitoring, configuration management, and quality assurance activities. The software project manager is delegated authority from senior management to make the required decisions and to deliver products of high quality using the organization's approved processes.
- d. **Software Task Leader** - The front-line supervisor of product engineering activity who manages a group of software practitioners. The software task leader is an experienced software practitioner and is assigned responsibility to plan and direct the work of subordinates in all phases of a software project's life cycle, following standard processes developed for use on the project. The software task leader takes direction from a software project manager.
- e. **Software Practitioner** - The programmer, analyst, or software engineer working as an individual contributor on any phase of a software project's life cycle. The software practitioner is primarily responsible for developing the work products associated with product engineering and takes direction from a software task leader or software project manager.
- f. **Technical Specialist** - Technical support staff member of a software project's support group such as configuration management or quality assurance, or responsible for process improvement for the organization or project. The technical specialist's activity may be directed by the software project manager on a small project or by a software task leader or Department SPI Agent on larger projects.
- g. **SPI Agent** - An assigned department Software Process Improvement (SPI) agent, or member of the Systems Engineering Process Office (SEPO).
- a. **Instructor** - An individual responsible for the preparation and/or presentation of training materials.

SECTION 2. REFERENCES

The following documents provide guidance for SSC San Diego Training:

- a. SSC San Diego Strategic Plan, TD-3000, March 1997. Identifies Core Values and Core Competencies.
- b. SSC San Diego Software Engineering Process Policy. SPAWARSYSCENINST 5234.1, 24 July 2000. Identifies SSC San Diego Software Engineering Goals.
- c. SSC San Diego Policy for Training Program. Version 1.1. Oct 9, 1997. At <http://sepo.spawar.navy.mil> under Training Program KPA. Establishes SSC San Diego's policy regarding training.
- d. SSC San Diego Training Program Process. PRX-TP-01 v1.0, 30 August 2000. Defines overall training program process and three types of SSC San Diego training, of which Type II is SEPO's responsibility covered by this Plan.
- e. SEPO Training Program Process, PR-TP-02 v1.0, Sept 1, 2000. Contains guidelines and steps for conducting training. Includes Course Development and Acquisition Procedure, Student Selection and Enrollment Procedures, Course Delivery Standards, and Training evaluation and Tracking Procedures previously contained in Sections 5-9 and Appendix B of this document before Version 2.3.
- f. Capability Maturity Model for Software, Version 1.1. CMU/SEI-93-TR-24, Software Engineering Institute, February 1993. Identifies Training Program as a Key Process Area for maturity level 3.
- g. Standard for Information Technology - Software Life Cycle Processes. IEEE/EIA 12207, March 1998. Defines Training as an organizational life cycle process; requires that "a training plan ... be developed and documented." (paragraph 7.4.1.1)
- h. Training Guidelines: Creating a Training Plan for a Software Organization. CMU/SEI-95-TR-007, Software Engineering Institute, September 1995. Provides information and formats for training plans.

SECTION 3. RESPONSIBILITY FOR THE PLAN

3.1 Management Ownership

The Executive Board shall perform the following functions:

- a. Establish software engineering goals that support the SSC San Diego Strategic and Business Plan.
- b. Establish policies regarding training of SSC San Diego Core Competencies.
- c. Review and approve this Software Engineering Training Plan to ensure it is consistent with the SSC San Diego strategic/business plans and core competency goals and training policies.
- d. Track the progress of SSC San Diego software engineering training.

3.2 Authorship and Revision Ownership

The Systems Engineering Process Office (SEPO) shall perform the following functions:

- a. Prepare and maintain this Software Engineering Training Plan for Type II training
- b. Maintain this Plan in the SSC San Diego San Diego Process Asset Library
- c. Report the progress of SSC San Diego Training to the Executive Board
- d. Update this Plan annually based on updated training requirements.

The SSC San Diego Training Office shall perform the following functions:

- a. Conduct a periodic command training needs analysis
- b. Provide facilities, scheduling, announcements, and record keeping of selected training courses.

3.3 Stakeholder Ownership

SSC San Diego Managers at the Department, Division, and Branch shall perform the following functions:

- a. Identify training requirements for the members of their staff (Course Descriptions in Section 5.1 and Course Sequences in Section 5.2 are provided as guidance).
- b. Ensure that training requirements are identified and necessary training is provided for projects within their organization. If needed, develop a department training plan (see guidance in reference e).
- c. Review training activities on a periodic basis for adequacy, appropriateness, and timeliness.

Project Managers shall perform the following functions:

- a. Identify training requirements for the members of their projects (Course Descriptions in Section 5.1 and Course Sequences in Section 5.2 are provided as guidance).
- b. Develop a project training plan (see guidance in reference e).
- c. Review successfully-completed training during performance reviews and for consideration in assignment of staff members.
- d. Maintain records of training completed by project members.

SEPO shall perform the following functions:

- a. Provide guidance to SSC San Diego project managers in preparation of project training plans with regard to software engineering training requirements.
- b. For in-house software engineering process courses, designate instructors to develop and conduct training based on command training requirements as documented in this Plan.

- c. Locate sources of training for software engineering and management skills identified in the SSC San Diego Software Engineering Training Plan.
- d. Collect and review feedback from software engineering training courses.
- e. Maintain records of training provided by SEPO.

SECTION 4. TRAINING OBJECTIVES

Software engineering training at SSC San Diego is designed to meet objectives which are derived from SSC San Diego's System Engineering Goals, desired personnel abilities, training priorities, the SSC San Diego Training Policy, and the Capability Maturity Model's training contained in Key Process Areas. Note that the Capability Maturity Model is being replaced by the Capability Maturity Model-Integrated (CMMI). The objectives are:

- a. Create a core of SSC San Diego software engineers with strong management and engineering skills.
- b. Create a SSC San Diego workforce with a general understanding and appreciation for disciplined management and engineering practices.
- c. Support the establishment of a culture of disciplined and improving software engineering and management practices.

4.1 Organizational Goals Supported

Software engineering training is designed to support the following SSC San Diego Systems Engineering Goals:

- a. Achieve the systems engineering and project management capability defined through CMMI Level 3 as a milestone to CMMI Level 5; migrate SW-CMM Level 3 capability across Center software projects.
- b. Produce quality systems in shorter development cycles.
- c. Reduce costs of supporting systems throughout the life cycle.
- d. Rapidly introduce new technology into the product and the systems development process and achieve successful transitions.
- e. Integrate software across traditional system boundaries to provide a composite set of capabilities to the end user.
- f. Continuously improve customer satisfaction.
- g. Continuously increase employee satisfaction.

4.2 Software Engineering Abilities of Software Personnel

The categories of SSC San Diego personnel require the abilities listed in the sections that follow.

4.2.1 Executive Board

- a. Establish, promulgate, and provide tracking and oversight of SSC San Diego Systems Engineering goals.
- b. Establish and enforce policy and infrastructure for the SSC San Diego software process improvement program.
- c. Understand the concepts covered in the CMMI and process improvement.

4.2.2 Senior Manager

- a. Support, promulgate, and provide tracking and oversight of SSC San Diego Systems Engineering goals.
- b. Conduct tracking and oversight of software development and maintenance projects.

- c. Establish, implement, and track software process improvement initiatives.
- d. Understand the concepts covered in the CMMI and process improvement.

4.2.3 Software Project Manager

- a. Support, promulgate, and provide tracking and oversight of SSC San Diego Systems Engineering goals.
- b. Plan and manage a software development or maintenance project.
- c. Understand the phases and components of the software life cycle.
- d. Clarify and control the project technical needs, budget and schedule constraints, standards and guidelines, and customer expectation and desires.
- e. Plan for, estimate, and track project activities and risks.
- f. Manage the quality and configuration of software and documentation.
- g. Support the definition, documentation, and improvement of project software engineering processes.
- h. Understand the structure and uses of the CMMI and process improvement.
- i. Foster cooperation and teamwork among team members, customers, contractors, and senior management.
- j. Guide the project team in implementing appropriate technologies and improvements.

4.2.4 Software Task Leader

- a. Understand the phases and components of the software life cycle
- b. Direct the work of engineering teams and support staff engaged in project activities
- c. Understand the structure and uses of the CMMI and process improvement
- d. Lead and oversee adherence to project processes, standards, and improvement activities
- e. Ensure accuracy and quality of process, project, and product measurement data.

4.2.5 Software Practitioner

- a. Understand the phases and components of the software life cycle
- b. Understand the specific application and requirements of the project and the software architecture
- c. Understand the structure and uses of the CMMI and process improvement
- d. Understand the need for objectivity and diligence in reporting measurement information
- e. Implement relevant, approved software processes and improvement activities.

4.2.6 Technical Specialist

- a. Understand the phases and components of the software life cycle
- b. Understand the structure and uses of the CMMI and process improvement
- c. Implement relevant, approved software processes and improvement activities.

4.2.7 SPI Agent

- a. Describe why SPI is a good business decision for SSC San Diego
- b. Define the SSC San Diego infrastructure and approach to SPI

- c. Champion and facilitate process definition implementation and improvement
- d. Build and document a process
- e. Describe the structure of the CMMI and process improvement
- f. Perform an appraisal of a software project
- g. Develop SPI process and plans for an SSC San Diego organization
- h. Facilitate tracking and reporting of process improvement status.

4.2.8 Instructor

- a. Understand the roles and responsibilities of software personnel
- b. Understand the structure and uses of the CMMI and process improvement
- c. Demonstrate skills and knowledge to perform training activities
- d. Prepare and present training courses in software engineering topics.

4.3 Training Policy

The SSC Policy for Training Program, reference (c), is shown in Table 4-1.

Table 4-1. SSC San Diego Policy for Training Program

SSC SAN DIEGO POLICY FOR TRAINING PROGRAM
Version 1.1 - 10/9/97

The purpose of the Training Program is to develop the skills and knowledge of individuals so they can perform their roles effectively and efficiently.

Training Program involves first identifying the training needed by SSC San Diego, projects, and individuals, then developing or procuring training to address the identified needs.

SSC SD shall:

1. Plan training activities.
2. Provide training for developing the skills and knowledge needed to perform software management and technical roles.
3. Provide the individuals in the software engineering group and software-related groups with the training necessary to perform their roles.
4. Appoint a group responsible for fulfilling the training needs of the organization.
5. Provide adequate resources and funding for implementing the training program.
6. Ensure that the members of the training group have the necessary skills and knowledge to perform their training activities.
7. Orient software managers on the training program.
8. Have each software project develop and maintain a training plan that specifies its training needs.
9. Develop and revise the organization's training plan according to a documented procedure.
10. Perform the training for the organization in accordance with the organization's training plan.
11. Develop and maintain training courses at the organization level according to organization standards.
12. Establish and use a waiver procedure for required training to determine whether individuals already possess the knowledge and skills required to perform their designated roles.
13. Maintain records of training.
14. Make and use measurements to determine the status of the training program activities.
15. Make and use measurements to determine the quality of the training program.
16. Review the training program activities with senior management on a periodic basis.
17. Evaluate the training program independently on a periodic basis for consistency with, and relevance to, the organization's needs.
18. Conduct reviews or audits on the training program activities and work products and report the results.

The SSC San Diego Commanding Officer is responsible for implementing this policy.

The Software Engineering Process Office (SEPO) is responsible for maintaining this policy.

4.4 Training for CMM Key Process Areas

Each Key Process Area (KPA) of the Capability Maturity Model (reference (f)) includes training requirements. The requirements for KPAs in Maturity Levels 2 through 5 are summarized in Appendix A, and use numerous titles for trainees. Included in Appendix A are the SSC San Diego Software Personnel Categories that relate to the KPA training, and the SSC San Diego courses (see Section 5.1) addressing these topics. Where "(project)" appears, the training responsibility rests with the individual project, and not with the organization.

SECTION 5. SOFTWARE ENGINEERING CURRICULUM

5.1 Course Descriptions

The following tables describe SSC San Diego software engineering courses. The history and student population of courses is contained in Appendix B.

Table 5-1. Software Project Management (SPM) Course

Purpose	To develop and improve the skills of the current or future software project manager to enable him/her to manage a software project to a successful conclusion.	
Objectives	<ul style="list-style-type: none"> • To develop and improve the skills required to plan and manage software development projects. • To understand the phases and components of the software life cycle. • To emphasize the early phases of the software development life cycle: requirements definition and project planning. • To improve the process by which software is developed at SSC San Diego, through the use of sound software engineering processes and principles, thereby improving software quality. • To expose the software project manager to a software development project by following and participating in a real-life case study from beginning to end of a project. • To better understand SSC San Diego's role in software development. 	
Attendees	Software project managers, software task leaders, software practitioners, Technical specialists, SPI agents	
Prerequisite	Experience in software development or maintenance.	
Topics	Software Engineering Process Software System Development Software System Reqmts Definition Directives and Standards for Software Software Estimation Software Development Planning Risk Management Software Project Tracking and Oversight COTS/GOTS Evaluation Software Reuse Contractor Acquisition and Performance Monitoring (CAPM)	Software Mgmt for Executives Guidebook Project and Peer Reviews Team Building People Management Software Requirements Review (SRR) Software Design Implementation Phase Software Testing Software Quality Assurance Configuration Management
Length	40 hours	
Handouts	SPM viewgraphs (approx. 400 pages) SPM exercises (approx. 100 pages) SME Guidebook (235 pages) Capability Maturity Model (approx. 530 pages)	
Taught by	SEPO	
Waivers	Not allowed	

Table 5-2. Software Management for Everyone (SME) Workshop

Purpose	SME is a 6-8 hour workshop on the fundamentals of fostering continuous improvement of software engineering and project management practices at the Center. This workshop covers how a process discipline provides the critical foundation for software project success, and the Center's approach for improving its software processes. This will be accomplished by discussing the rationale for the development and use of software engineering and management processes. The importance and application of measurement in tracking project progress and process improvement at various management levels also will be emphasized. (Note: this workshop combines the previous Software Management for Executives workshop and the SPIRIT course.)
Objectives	<ul style="list-style-type: none"> • Promote understanding, promulgation, and commitment to achievement of the SSC San Diego software engineering goals. • Examine the approach for achieving software engineering and project management excellence on SSC San Diego software-intensive projects through disciplined performance of technical and management practices. • Support SSC San Diego managers in establishing and implementing a Software Process Improvement (SPI) program.
Attendees	Process improvement applies to everyone; including department heads, division managers, other upper-level executives, and sponsors who oversee other managers directly responsible for software-intensive projects. This workshop is equally applicable to all project team members involved in software process improvement. There are no prerequisites except knowledge of the software life cycle and a desire to start SPI within their own groups. SSC San Diego contractors are also welcome.
Prerequisite	None
Topics	<p><i>Clarifying the Need for SPI.</i> Return on investment data, references to success stories, and a business case for why project resources should be expended on SPI.</p> <p><i>Understanding the CMM.</i> The structure, format, and content of the CMM; the model chosen by SSC San Diego to guide improvement activities.</p> <p><i>Implementing SPI.</i> SSC San Diego's Software Engineering Goals and the Software Engineering Process Policy set the stage for software process improvement within the organization and all Departments. The details of each step are covered in this section.</p> <p><i>Tracking Progress.</i> The Software Management for Executives Guidebook and the SSC instruction covering program reviews.</p> <p><i>Implementing SPI on Your Project.</i> The resources and support available at SSC and the steps for initiating SPI on a project.</p>
Length	6-8 hours
Handouts	SME Guidebook (235 pages) SME course viewgraphs (approx. 50 pages)
Taught by	SEPO
Waivers	Attendance at previous SME or SPIRIT course

Table 5-3. Overview of the Capability Maturity Model (CMM)

Purpose	Introduction to the CMM for Software (SW-CMM), the framework that organizations use to determine their ability to develop and maintain software. This course introduces the SW-CMM and its fundamental concepts. Discussion emphasizes understanding of the five maturity levels and their characteristic key process areas (KPA's).
Objectives	CMM training helps prepare individuals to make valid judgements regarding an organization's implementation of the KPA's. The course is helpful in identifying issues that should be addressed in performing software process improvement as structured by the CMM.
Attendees	SPI Agents and Technical Specialists responsible for SPI.
Prerequisite	none
Topics	<ul style="list-style-type: none"> • Introduction – about the process program • Software process maturity – SW-CMM principles • SW-CMM overview • Value of the SW-CMM – case studies of software process improvement • Levels and KPA's of the SW-CMM • Linking the KPA's together – common themes • Interpreting the SW-CMM • Future directions of the SW-CMM
Length	1 to 3 days
Taught by	SEPO or outside vendor (e.g., Software Engineering Institute)
Waivers	CMM presentation at a national software engineering conference; or two-hour presentation by qualified instructor/expert; or attendance at 90% of SEPO's SPI meetings addressing CMM Level 2 and 3 matrices

Table 5-4. Training in Best Practices and CMM Key Process Areas (KPA's)

Purpose	Multiple courses designed to provide in-depth coverage of best practices and each Level 2 and 3 KPA. Note that these subjects are addressed in the Software Project Management course. KPA courses below use the CMM Maturity Level Briefing and other course material as a core, and add additional material described below.																																														
Objectives	Familiarize students with the goals, commitments, abilities, activities, measurements, and verifications of best practices and/or individual KPA's.																																														
Attendees	Software Project Managers, Software Task Leaders, software practitioners, Technical specialists, and SPI agents as necessary for individual KPA's.																																														
Prerequisite	SPM course.																																														
Topics	<p>Individual presentations. Level 2 and 3 KPA's include the presentation "The CMM for Software: an Overview" (at http://sepo.spawar.navy.mil under CMM and Appraisals.) KPA presentations also include:</p> <ul style="list-style-type: none"> • The Goals of the Best Practice/KPA • Commitment to perform, ability to perform, responsibilities • Overview of Activities • The Process <p>Presentations are based on the following Courses/Sessions:</p> <table> <thead> <tr> <th><u>Topic</u></th><th><u>Course/Session</u></th></tr> </thead> <tbody> <tr> <td>Requirements Management</td><td>SPM/Software System Requirements Definition</td></tr> <tr> <td>Software Project Planning</td><td>SPM/Software Development Planning (and exercise)</td></tr> <tr> <td></td><td>SPM/Software Estimation (and exercises)</td></tr> <tr> <td></td><td>SPM/Risk Management</td></tr> <tr> <td>Software Proj. Track/Oversight</td><td>SPM/Software Proj. Track/Oversight</td></tr> <tr> <td>Software Quality Assurance</td><td>SPM/Software Quality Assurance</td></tr> <tr> <td>Software Configuration Mgmt</td><td>SPM/Software Configuration Mgmt (and exercise)</td></tr> <tr> <td>Software Subcontractor Mgmt.</td><td>SPM/Contractor Acquisition & Perf. Monitoring</td></tr> <tr> <td>Organizational Process Focus</td><td>SPM/Summary, SME</td></tr> <tr> <td>Organizational Process Def'n</td><td>SPM/Summary, SME</td></tr> <tr> <td>Training Program</td><td>SPM/Summary, TTT</td></tr> <tr> <td>Integrated Software Mgmt.</td><td>SPM/Summary, SME</td></tr> <tr> <td>Software Product Engineering</td><td>SPM/Software System Requirements Definition</td></tr> <tr> <td></td><td>SPM/Software Design</td></tr> <tr> <td></td><td>SPM/Implementation Phase</td></tr> <tr> <td></td><td>SPM/Software Testing</td></tr> <tr> <td>Intergroup Coordination</td><td>SPM/Project and Peer Reviews, Team Training</td></tr> <tr> <td>Peer Reviews</td><td>Peer Review Workshop (see Table 5-5)</td></tr> <tr> <td>Risk Management</td><td>SPM/Risk Management</td></tr> <tr> <td>Software Testing</td><td>SPM/Software Testing</td></tr> <tr> <td>Reuse</td><td>SPM/Software Reuse</td></tr> <tr> <td>Team Skills</td><td>SPM/People Management, Team Training</td></tr> </tbody> </table>	<u>Topic</u>	<u>Course/Session</u>	Requirements Management	SPM/Software System Requirements Definition	Software Project Planning	SPM/Software Development Planning (and exercise)		SPM/Software Estimation (and exercises)		SPM/Risk Management	Software Proj. Track/Oversight	SPM/Software Proj. Track/Oversight	Software Quality Assurance	SPM/Software Quality Assurance	Software Configuration Mgmt	SPM/Software Configuration Mgmt (and exercise)	Software Subcontractor Mgmt.	SPM/Contractor Acquisition & Perf. Monitoring	Organizational Process Focus	SPM/Summary, SME	Organizational Process Def'n	SPM/Summary, SME	Training Program	SPM/Summary, TTT	Integrated Software Mgmt.	SPM/Summary, SME	Software Product Engineering	SPM/Software System Requirements Definition		SPM/Software Design		SPM/Implementation Phase		SPM/Software Testing	Intergroup Coordination	SPM/Project and Peer Reviews, Team Training	Peer Reviews	Peer Review Workshop (see Table 5-5)	Risk Management	SPM/Risk Management	Software Testing	SPM/Software Testing	Reuse	SPM/Software Reuse	Team Skills	SPM/People Management, Team Training
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Team Skills	SPM/People Management, Team Training																																														
Length	Varies by topic; 1 to 8 hours																																														
Taught by	Peer Reviews by SEPO; Other KPA's by SPI Agents or Project Practitioners																																														
Waivers	Demonstrated proficiency or attendance at equivalent training, as approved by individual's Project Manager																																														

Table 5-5. Peer Review Workshop

Purpose	Provide students with the skills necessary to improve software quality through a process of eliminating defects in software products.
Objectives	Help all parties involved in software development and maintenance to eliminate defects and defect propagation from software work products.
Attendees	All developers, SQA and SCM personnel, and managers of software-intensive projects.
Prerequisite	None
Topics	<ul style="list-style-type: none"> • How to conduct a productive peer review of any work product • How to determine the description and severity of a defect • How to collect data (metrics) for tracking one measure of software quality
Length	4-6 hours. Lectures, and one or two exercises.
Taught by	SEPO
Waivers	Demonstrated proficiency, or attendance at equivalent training (e.g., SPM before 3/99), as approved by the SEPO Director or the individual's Project Manager

Table 5-6. CMM-Based Appraisal (CBA) Evaluator Training SCE V3.0

Purpose	In-depth training of team members responsible for conducting software capability evaluations (SCEs).
Objectives	The course provides team members with an understanding of the SCE method, and provides the skills to effectively conduct an evaluation. Individuals are trained in a team environment.
Attendees	SPI Agents.
Prerequisite	10 years of software acquisition, development, or management experience recommended. CMM knowledge required.
Topics	<ul style="list-style-type: none"> • Appraisal framework and method overview • Process relationships and other methods • In-depth guided and independent case studies
Length	40 hours. Lectures, exercises, and case studies.
Taught by	SEI Transition Partners and certified vendors (e.g., ISD Inc.)
Waivers	Not allowed

Table 5-7. Train the Trainer

Purpose	Presentation of training techniques and styles needed to instruct software engineering and project management courses at SSC San Diego.
Objectives	Expand presentation skills of the instructors.
Attendees	Individuals assigned to teach software engineering courses.
Prerequisite	SPM course. Instruction experience desired, but not required.
Topics	<ul style="list-style-type: none"> • History of SEPO courses and training program • Presentation skills and format • Individual research on topics • Walkthrough of course planning and presentation • Dry runs of presentations • Course logistics
Length	8 hours
Taught by	SEPO
Waivers	Attendance at equivalent training and/or demonstrated skills at instruction as approved by the SEPO Director

Table 5-8. High Performance Organizations (HPO) Seminar

Purpose	The purpose of the HPO seminar is to enable participants to improve the performance of their work groups and the SSC San Diego organization as a whole through the use of the HPO concepts.
Objectives	<ul style="list-style-type: none"> • The HPO seminar lays out a set of concepts and principles to which the Center is committed. These concepts provide a framework that will enable SSC San Diego to operate successfully in the dynamic and challenging business environment where we must now compete.
Attendees	Employees from all parts of the organization at every level
Prerequisite	none
Topics	<ul style="list-style-type: none"> • Definition of high performance • Six organizational “change levers” • The importance of leadership philosophy • Consultative and participative leadership • The Networked Talent Model • Key outcomes: “Pick 3” + Values • Learning to diagnose your organization to effect improved performance
Length	Three days
Taught by	Commonwealth Center for HPO and SSC San Diego facilitators
Waivers	Attendance at Accelerating Change (AC) program; or SEPO’s “Building Management Support for SPI” brief and SEPO’s HPO Overview brief

Table 5-9. Guidelines for Successful Teams (Team Training)

Purpose	To help individuals learn to work together efficiently and effectively as a team to accomplish a given task.
Objectives	Identify guidelines that will help teams <ul style="list-style-type: none"> • Achieve team success • Organize and operate effectively • Solve problems • Promote team member cooperation and communication • Enhance team member awareness and desire to improve teamwork.
Attendees	Senior Managers, Software Project Managers, Software Task Leaders, SPI Agents
Prerequisite	none
Topics	<ul style="list-style-type: none"> • Why teams are needed, and why teamwork is important • How to tell if a team is successful • What is involved in forming a team • How to organize and run a team • How to hold effective team meetings • What behaviors are necessary to promote teamwork • How to make decisions and work through problems
Length	4 hours
Taught by	SEPO or outside vendor
Waivers	Attendance at equivalent training, as approved by the SEPO Director or Project Manager

Table 5-10. High-Maturity Processes (HMP)

Purpose	To assist software projects and the organization to progress to higher maturity processes as described by Maturity Levels 4 and 5.
Objectives	To be developed. HMP is expected to address multiple topic areas for multiple audiences, and may evolve into several separate courses.
Attendees	As determined for different topics: Senior Managers, Software Project Managers, Software Task Leaders, Software Practitioners, Technical Specialists, SPI Agents
Prerequisite	To be determined
Topics	<ul style="list-style-type: none"> To be determined from the requirements of Level 4 and 5 Key Process Areas
Length	To be determined
Taught by	To be determined
Waivers	To be determined

Table 5-11. Basic Earned Value Tracking

Purpose	The workshop is designed as a Just-in-Time (JIT) course to familiarize personnel involved in managing project tasking with the basic concepts of earned value management. Earned value is an "early warning" tool that is an enhancement over traditional management measures that focus on planned costs and actual costs. Earned value goes one step further to examine actual task accomplishments relative to the expenditures (planned and actual). The course utilizes basic tools that may be tailored from the SSC San Diego Process Asset Library to demonstrate by example a process for accomplishing earned value tracking on a project.
Objectives	<p>Explain the key terminology and concepts of earned value and demonstrate by example how to facilitate earned value tracking. The student will understand and be able to track the following:</p> <ul style="list-style-type: none"> Budgeted Cost of Work Scheduled (BCWS) Budgeted Cost of Work Performed (BCWP) Actual Cost of Work Performed (ACWP) Cost Variance (CV) Schedule Variance (SV) Cost Performance Index (CPI)
Attendees	The course is intended for small, project-centric groups.
Prerequisite	none
Topics	<ul style="list-style-type: none"> Key earned value terminology An understanding of the value added to management of earned value tracking The SSC San Diego process assets that are available to help implement earned value tracking A basic process for applying earned value tracking to the project A demonstration of earned value tracking using SSC San Diego process assets
Length	1 hour presentation with time for student interaction and questions.
Taught by	SEPO
Waivers	Attendance at equivalent training, as approved by the SEPO Director or Project Manager

Table 5-12. Estimation using the Organization Software Process Database

Purpose	The workshop is designed as a Just-in-Time (JIT) course to familiarize personnel involved in managing projects to develop more accurate cost, schedule, and resource estimates. The process will employ the industry recognized Constructive Cost Model (COCOMO). The COCOMO model provides basic algorithms for estimating cost, resources, and schedule. In addition, the COCOMO model identifies high impact cost drivers that are project variables that can impact an estimate. Tailoring COCOMO to a project involves analyzing historical data from similar projects and modifying the basic algorithms to create a model of the project needing estimation. This course will demonstrate using the SSC San Diego OSPD in creating project models, using those models with COCOMO tools to generate estimates, and interactively analyzing risk by varying project variables, the cost drivers.
Objectives	<p>Provide project personnel involved in estimation with an understanding of a repeatable process that will produce low risk estimates for cost, resources, and schedule. Fundamentals addressed would include those listed below:</p> <ul style="list-style-type: none"> • Learn basic algorithms to estimate effort and schedule • Identify project unique process variables and their impact on an estimate • Learn how to analyze the SSC San Diego Organization Software Process Database (OSPD) to provide data points needed to modify the basic algorithms • Understand how to apply software tools to facilitate the estimation process
Attendees	The course is intended for small, project-centric groups.
Prerequisite	none
Topics	<ul style="list-style-type: none"> • A basic estimation process • Algorithms fundamental to estimation • Methods for tailoring the algorithms to one's project • The use of a calibration tool to create a model of your software engineering process • The use of an estimation tool, based on your model, to create estimates • Evaluating project risk by varying project process variables
Length	1 hour presentation with time for student interaction and questions.
Taught by	SEPO
Waivers	Attendance at equivalent training, as approved by the SEPO Director or Project Manager

Table 5-13. Statistical Process Control Basics

Purpose	The workshop is designed as a Just-in-Time (JIT) course to familiarize personnel involved in managing and tracking project product development with a basic knowledge of the terminology and application of SPC. SPC is a tool that provides precise quantitative insights into processes that impact the development of product or service. SPC is best known in industry through the work of W. Edwards Deming on quality. Deming is quoted as saying, "A state of statistical control is not a natural state. It is instead an achievement, arrived at by elimination, one by one, by determined effort, of special causes of excessive variation". The course utilizes basic SPC concepts to illustrate the terms, application, and impact on product quality to help the student better understand Deming's observation.
Objectives	<p>Provide an awareness of the following:</p> <ul style="list-style-type: none"> • The inter-relationship of SPC and the higher levels of software maturity as defined by the Capability Maturity Model for Software (SW-CMM) • Understanding process variations in quantifiable terms • Establishing process baselines in quantifiable terms • Quantitative insight for process improvement • Validating quantitatively the effect of process changes • Decision making based on quantitative analysis rather than opinion
Attendees	The course is intended for small, project-centric groups.
Prerequisite	none
Topics	<ul style="list-style-type: none"> • Key SPC terminology • How to establish 'Natural' process baselines • Tools for setting 'Targets' for process improvement • How to identify 'Out of Control' events • Determine process stability (Magnitude of Variation) • Examples of applying the most commonly used charts • X Chart - individual sample measurement • MR Chart - moving range of variation between samplesA quantitative view of process and quality • How SPC facilitates higher levels of maturity of the SW-CMM
Length	1 hour presentation with time for student interaction and questions.
Taught by	SEPO
Waivers	Attendance at equivalent training, as approved by the SEPO Director or Project Manager

Table 5-14. The Project Data Form

Purpose	The workshop is designed as a Just-in-Time (JIT) course to educate project personnel on data collection requirements. The Capability Maturity Model for Software (SW-CMM), Levels 3 and above, calls for the organization to collect and analyze project data to evolve toward a quantitative understanding of software engineering processes. The data requested in the PDF are the inputs to the OSPD. The OSPD provides the data for the analysis that will lead to constant process improvement in estimation accuracy, defect containment, cycle time reductions, customer satisfaction, and other issues critical to an organization's success. This workshop clarifies the PDF requirements to ensure accurate and timely submittal of the necessary data.
Objectives	<p>To provide guidance on data submittal for the following items:</p> <ul style="list-style-type: none"> • Project Identification and categorization • Schedule, resource and cost profiles • Documentation identification, size, and peer review methods • Computer resource utilization • Software size factors • Requirements test coverage • Defects • Maintenance • Customer satisfaction • Project risks characteristics • New technology adaptation • Lessons learned • Project tools
Attendees	The course is intended for small, project-centric groups.
Prerequisite	none
Topics	<ul style="list-style-type: none"> • The importance of the data to constant process improvement • The structure of the PDF • Required PDF submittal frequency • The data requirements and tailoring latitude for each section of the PDF
Length	1 hour presentation with time for student interaction and questions.
Taught by	SEPO
Waivers	Attendance at equivalent training, as approved by the SEPO Director or Project Manager

5.2 Course Requirements by Job Category

Required and optional courses by job category are shown in Table 5-15.

Table 5-15. Courses by Job Category

Job Category		Executive Board	Senior Manager	Software Project Manager	Software Task Leader	Software Practitioner	Technical Specialist	SPI Agents	Instructors
SEPO Course									
Software Management for Everyone		x	x	x	x	x	x	x	
Software Project Management				x	x	o	o	x	x
High Performance Organizations		x	x	x	x	x	x	x	
Guidelines for Successful Teams				x	x	x	x	x	
Train the Trainer									x
Peer Review Workshop				x	x	x	x	x	
CBA Evaluation Training								x	o
Overview of the CMM							x/o	x	
Basic Earned Value Tracking				o	o			x	
Estimation using the OSSP				o	o			x	
Statistical Process Control Basics				o	o			x	
The Project Data Form				o	o			x	
Higher-Maturity Processes		To be determined							
Department/ Project Best Practices and KPA Training	Reqs Mgmt.			x	x	o	o	o	
	Soft. Proj. Planning			x	x	o	o	o	
	Proj Track/Oversight			x	x	o	o	o	
	Software QA			x	x	o	o	o	
	Software CM			x	x	o	o	o	
	Software Sub. Mgmt.			o	o	o	o	o	
	ISM and SPE			x	x	o	o	o	
	Intergroup Coord.			x	x	o	o	o	
	Risk Management			x	x	o	o	o	
	Software Testing			x	x	o	o	o	
	Software Reuse			o	o	o	o	o	

x = Required course.

o = Optional; could be required depending on job assignment and project phase.

SECTION 6. FY2003 TRAINING NEEDS ANALYSIS AND SCHEDULE

6.1 Priorities

Current priorities for software engineering training, established by SEPO and SPI Agents, are shown in Table 6-1. Training requirements and records for SPI Agents are contained in Appendix C, and for Instructors in Appendix D.

Table 6-1. FY2003 Training Analysis

Priority	Popula- tion	Comple- ted	FY2003 Need: SME	FY2003 Need: SPM	FY2003 Need Team Training
a. All SPI Agents complete SME	20	19	1		
b. All SPI Agents complete SPM	20	19		1	
c. All SPI Agents complete Team Training	20	19			1
d. Executive Board, Division Heads, other managers in chain of command of SPI Projects complete SME	82	69	13		
e. SPI Project managers and SPI Leads complete SPM	39	33		6	
f. Key SPI Project personnel complete SME	Est 500	Est. 400	Est. 100		
g. All SPI Project personnel complete Team Training	613	Est. 300			300
h. All SSC San Diego military officers complete SME	Est. 60	10	Est. 50		
i. (Recommended) Software Task Leaders and selected Software Practitioners and Technical Specialists from Software Projects complete SPM	Est. 200	Est. 100		Est. 100	
j. (Recommended) Other managers in business planning or ops for Departments, other managers who have software projects, and sponsors complete SME	37	4	33		
Totals			~ 200	~ 100	~ 300

6.2 Training Schedule

Based on the above training analysis, the FY2003 schedule for SEPO courses is as follows:

- SME Workshop (20-50 students per class): to be held four times: 10/02, 1/03, 4/03, 7/03
- SPM Course (18-24 students per class) to be held four times: 11/02, 2/03, 5/03, 9/03
- Team Training Workshop (20-50 students per class): to be held four times: 12/02, 4/03, 6/03, 9/03
- Peer Review Workshops (12-30 students per class): to be held four times: 11/02, 3/03, 5/03, 8/03

SECTION 7. FY2003 TRAINING RESOURCE REQUIREMENTS

The following requirements are based on the assumption of routine updates to existing course material, and presentations as scheduled in Section 6.

7.1 Staff

Staff and hours needed for each Software Project Management course:

- Presentation by SEPO Instructors (Brian Groarke, Callie Leef, Cynthia Pham, Joe Reyna, George Robertson, Jim Wells, and/or Bill Windhurst) 65 hours
 - Presentation by other Instructors (Mike Moser, Alan Olson, Bryan Riegle, Charlie Sampson) 15 hours
 - Preparation of handouts, updates, logistics (SEPO staff) 220 hours
- SPM total: 300 hours x 4 courses in FY2003 = 1,200 hours

Staff and hours needed for each Software Management for Everyone workshop:

- Presentation by SEPO Instructors (Brian Groarke and/or Jim Wells) 20 hours
 - Preparation of handouts, updates, logistics (SEPO staff) 60 hours
- SME total: 80 hours x 4 courses in FY2003 = 320 hours

Staff and hours needed for each Team Training workshop:

- Presentation by SEPO Instructors (Brian Groarke and/or Jim Wells) 10 hours
 - Preparation of handouts, updates, logistics (SEPO staff) 25 hours
- Team Training total: 35 hours x 4 courses in FY2003 = 140 hours

Staff and hours needed for each Peer Review workshop:

- Presentation by other Instructors (Alan Olson or Mike Moser) 8 hours
 - Preparation of handouts, updates, logistics (SEPO staff) 16 hours
- PR total: 24 hours x 4 workshops in FY2003 = 96 hours

Staff and hours needed to develop High-Maturity Processes (SEPO staff)

Total: training hours in FY2003 = 300 hours
2,056 hours

7.2 Tools and Materials

In current inventory:

- PC Laptop computer and cordless Mouse, extra batteries
- Epson Presentation Projector, extra bulb
- Viewgraph projector and screen, extra bulbs

Handouts for each class: Student handouts and notebooks (SME: 350 pages and notebook; SPM: 1,500 pages in 3 notebooks; Team Training 70 pages, Peer Reviews 56 pages)

Purchased for each class: Supplies: marker pens, paper, pencils, post-its, viewgraph etc.

7.3 Facilities

- Classroom space (Building 88 room 1, Building 128 Auditorium, Building 600 room 233, etc.)

APPENDIX A. TRAINING REQUIREMENTS OF CMM KEY PROCESS AREAS

KPA	Training Topic	CMM Trainee title	SSC San Diego Category	Course
Requirements Management	Requirement Management Activities: methods, standards and procedures used by the project; the application domain	Software engineering group, other software - related groups	Software Practitioner	SPM RM KPA
Software Project Planning	Software estimating and planning procedures	Software managers, software engineers and other involved individuals	Software Project Manager; Software Practitioner	SPM SPP KPA
Software Project Tracking and Oversight	Management of technical and personnel aspects of the software project: managing technical projects; tracking and oversight of software size, effort, cost and schedule; managing people	Software managers	Software Project Manager, Software Practitioner	SPM SPTO KPA
	Orientation training: project's software engineering standards and procedures; the project's application domain	First-line software managers	Software Task Leader	(project)
Software Subcontract Management	Establishment and management of the software subcontract: preparing and planning for software subcontracting; evaluating a software bidder's software process capability; evaluating a software bidder's software estimates and plans; selecting a subcontractor; managing a subcontract	Software Managers and other involved individuals	Software Project Manager	SPM SSM KPA
	Orientation training in the technical aspects of the subcontract: application domain; software technologies being applied; software tools being used; methodologies being used; standards being used; procedures being used	Software Managers and others involved with managing the software subcontract	Software Project Manager and others	(project)
Software Quality Assurance	SQA Activities: software engineering skills and practices; roles and responsibilities of the software engineering group and other software-related groups; standards, procedures, and methods for the software project; SQA objectives, procedures, and methods; involvement of the SQA group in the software activities; effective use of SQA methods and tools; interpersonal communications	SQA Group	Technical Specialist	SPM SQA KPA

KPA	Training Topic	CMM Trainee title	SSC San Diego Category	Course
Software Quality Assurance	Orientation training on role, responsibilities, authority, and value of the SQA Group	Members of software projects	Software Practitioner	SPM SQA KPA
Software Configuration Management	Objectives, procedures, and methods for performing SCM Group Activities: SCM standards, procedures, and methods; SCM tools	SCM Group	Technical Specialist	SPM SCM KPA
Organization Process Focus	Training to perform these activities: software engineering practices; process control techniques; organization change management; planning, managing, and monitoring the software process; technology transition	Members of the group responsible for the organization's software process activities	SPI Agent	SME
	Orientation training on the organization's software process activities and their roles in these activities	Software engineers and other software-related groups	Software Practitioners, Technical Specialists	SME
Organization Process Definition	Required training to perform these activities: software engineering practices and methods; process analysis and documentation methods; process modeling	The individuals who develop and maintain the organization's standard software process and related process assets	SPI Agent	SME
Training Program	Members of the training group have the necessary skills and knowledge to perform training activities: training in instructional techniques; refresher training in subject matter	Training Group	Instructor	TTT
	Orientation training on the training program	Software Managers	Software Project Manager	SPM
	Training appropriately done by the software project: training in specific applications and requirements of the project; training of the project's software architecture; training in other topics unique to the project	project members	Software Practitioner, Technical Specialist	(project)
Integrated Software Management	Required training in how to tailor the organization's standard software process and use the related process assets: using the software process database; using the organization's standard software process; using the guidelines and criteria for tailoring the organization's standard software process to meet the needs of the software project	The individuals responsible for developing the project's defined software process	Software Project Manager, Software Practitioner, SPI Agent	SME ISM/SPE

KPA	Training Topic	CMM Trainee title	SSC San Diego Category	Course
Integrated Software Management	Managing the technical, administrative, and personnel aspects of the software project based on the project's defined software process: methods and procedures for software estimating, planning, and tracking based on the project's defined software process; methods and procedures for identifying, managing, and communicating software risks	Software managers	Software Project Manager	SPM ISM/SPE
Software Product Engineering	<p>Software engineering technical training to perform technical assignments:</p> <p>Software Requirements Analysis: principles of analyzing software requirements; the existing software requirements for any existing software to be maintained; skills to interview end users and application domain experts in order to establish the software requirements; the use of the tools, methods, conventions, and standards selected by the project for analyzing software requirements</p> <p>Software Design: design concepts; the existing design for any existing software to be maintained; use of the tools, methods, conventions, and standards selected by the project for designing software</p> <p>Coding: the selected programming language(s); reviewing the existing source code for any existing source code to be maintained; use of the tools, methods, conventions, and standards selected by the project for programming; unit testing techniques</p> <p>Software Testing and other verification techniques: verification methods (analysis, demonstration, and inspection as well as test); test planning; use of the tools, methods, conventions, and standards selected by the project for testing and verifying the software; criteria for test readiness and completion; measuring test coverage</p>	Assigned Software Engineering Technical Staff	Software Practitioner	SPM ISM/SPE

KPA	Training Topic	CMM Trainee title	SSC San Diego Category	Course
Software Product Engineering	Orientation training in related software engineering disciplines: software requirements analysis; software design; coding; testing; software configuration management; software quality assurance	Software Engineering Technical Staff not specifically assigned in these areas	Technical Specialists	SPM ISM/SPE
	Orientation training in the technical aspects of the software project: software engineering methods and tools; application domain; software technologies being applied; software tools being used; methodologies being used; standards being used; procedures being used	Software Managers and other involved individuals	Software Project Manager and others	(project)
Intergroup Coordination	Teamwork training: building teams; managing teams; establishing, promoting, and facilitating teamwork; group dynamics	All managers	Senior Manager, Software Project Manager	Team Training
	Orientation training in the processes, methods, and standards used by other engineering groups	All task leaders in each engineering group	Software Task Leader	(project)
	Orientation in working as a team	The members of the engineering groups	Software Practitioner	Team Training
Peer Reviews	Training in how to lead Peer Reviews: the objectives, principles, and methods of peer reviews; planning and organizing a peer review; evaluating readiness and completion criteria for peer review; conducting and facilitating a peer review; reporting the results of a peer review; tracking and confirming rework to address the actions identified in a peer review; collecting and reporting the data required for the peer reviews	Peer Review Leaders	Software Task Leader	SPM; Peer Review Workshop
	Training in the objectives, principles, and methods of peer reviews: types of peer reviews (e.g. reviews of software requirements, software design, code, and software test procedures); roles of reviewers; estimating the effort for preparing and participating in peer reviews	Peer Review Participants	Software Practitioner, Technical Specialist	Peer Review Workshop

KPA	Training Topic	CMM Trainee title	SSC San Diego Category	Course
Quantitative Process Management (Level 4)	Training to perform QPM activities. Examples of training include modeling and analyzing the software process; selecting, collecting, and validating process measurement data; and applying basic quantitative methods and analysis techniques (e.g., estimation models, Pareto diagrams, and control charts)	Individuals implementing or supporting QPM	Software Practitioner	HMP
	Orientation on the goals and value of quantitative process management	Members of the software engineering group and other software-related groups	Software Practitioner	HMP
Software Quality Management (Level 4)	Training to perform SQM activities. Examples of training include: planning quality commitments and goals for the product, measuring product and process quality, and controlling product quality using the defined software process	Individuals implementing and supporting SQM	Software Team Leader, Software Practitioner	HMP
	Training in SQM. Examples of training include: understanding the goals and benefits of quantitatively managing product quality, collecting measurement data, understanding the quality measurements for the software process and product, and planning and controlling the quality of the software product	Members of the software engineering group and other software-related groups	Software Practitioner	HMP
Defect Prevention (Level 5)	Training to perform defect prevention activities. Examples of training include defect prevention methods, conduct of task kick-off meetings, conduct of causal analysis meetings, and statistical methods (e.g., cause/effect diagrams and Pareto analysis)	Members of the software engineering group and other software-related groups. Examples of software-related groups include software quality assurance, software configuration management, and documentation support.	Software Practitioner, Technical Specialist	HMP

KPA	Training Topic	CMM Trainee title	SSC San Diego Category	Course
Technology Change Management (Level 5)	Training to perform TCM activities. Examples of training include the organization's standard software process, technology transfer and change management, software process improvement, tools and methods used by the organization, analytical and support facilities available to the organization, and principles of statistical quality control	Members of the group responsible for the organization's technology change management activities	SPI Agent	HMP
Process Change Management (Level 5)	Training in software process improvement. Examples of training include managing technological and organizational change, team building, and teamwork skills as applied to continuous process improvement	Software managers	Software Project Manager, Software Team Leader	HMP
	Training in software process improvement. Examples of training include the principles of quality and process improvement, and the procedures for proposing process improvements	Managers and technical staff of the software engineering group and other software-related groups. Examples of software-related groups include software quality assurance, software configuration management, and documentation support.	Software Project Manager, Software Team Leader, Software Practitioner, Technical Specialist	HMP
	Training in software process improvement. Examples of training include benchmarking and comparative evaluation, principles of process improvement, setting and tracking goals for process improvement, and motivation and team building in an environment of continuous process improvement	Senior management	Senior Manager	HMP

APPENDIX B. COURSE HISTORY AND SCHEDULE

Actual and planned software engineering courses are shown in Table B-1.

Table B-1. Course History and Future Schedule

Course	Held 1990- 1998	Held in CY 1999	Held in CY 2000	Held in CY 2001	Held CY 2002 to 10/1	Total Students Taught to 10/1/02	Next Scheduled Course
Software Mgmt for Everyone	-	5	5	5	2	528	Quarterly in FY2003
Software Project Management	40	4	3	4	3	999	Quarterly in FY2003
SPIRIT	3	6	-	-	-	261	(combined with SME)
Guidelines for Successful Teams	-	-	3	5	4	396	Quarterly in FY2003
Overview of the CMM	1	-	-	1	-	35	Upon request
Software QA KPA	-	-	1	-	-	8	By Project
Software CM KPA	5	-	1	-	-	39	By Project
Peer Review Workshop	18	11	7	4	4	823	Quarterly in FY2003
CMM Based Appraisals	1	-	-	-	-	49	Upon request
Train the Trainer	-	-	-	-	-	25	Upon request
Accelerating Change	1	-	-	-	-	24	Upon request
Microsoft Project	-	1	-	-	-	12	Upon request
Software Capability Evaluations	4	-	2	-	-	49	Upon request

Note: The SEPO Training Database is at <http://sepo.spawar.navy.mil/> under the Information Library on the SSC SPI Agent Web Page (restricted access). It contains current schedules and student records, and is updated quarterly.

APPENDIX C. SPI AGENT TRAINING PLAN

C.1 Training Staff

The SPI Agent Training Program Manager is the SEPO Director, Brian Groarke. The Training Program Coordinator is Jim Wells. Implementers are assigned as needed.

C.2 Skills Needed

The SSC San Diego Software Engineering Training Plan calls for the following abilities for SPI Agents:

- a. Describe why SPI is a good business decision for SSC San Diego
- b. Describe the SSC San Diego infrastructure and approach to SPI
- c. Champion and facilitate process definition implementation and improvement
- d. Build and document a process, and tailor an organizational process
- e. Describe the structure of the Capability Maturity Model and process improvement
- f. Perform an appraisal of a software project
- g. Develop SPI process and plans for an SSC San Diego organization
- h. Facilitate tracking and reporting of process improvement status.

C.3 Training Requirements

SPI Agents are required to complete the following training courses:

- a. Software Project Management class (SPM)
- b. Either one of: SME or SPIRIT
- c. Overview of the CMM; obtained by attending
 - CMM class presented by SEI (3 days or 1 day with SCE training)
 - CMM presentation at a national software engineering conference
 - Two-hour presentation by a qualified instructor/expert
 - SEPO's SPI meetings addressing 90% of the CMM Level 2 and 3 matrices
- d. Either Software Capability Evaluation (SCE) training, or a SEPO or equivalent Overview
- e. Peer Reviews; either in a Peer Review Workshop or as part of SPM before 3/1999
- f. High-Performance Organizations, or Accelerating Change, or SEPO's "Building Management Support for SPI" brief (4/3/00) AND SEPO's HPO Overview brief (3/7/00, 9/25/00)
- g. Microsoft Project (optional)
- h. SEPO's Guidelines for Successful Teams Workshop

C.4 Training Records

Training requirements and dates completed for current SPI Agents are shown in Table C-1.

C.5 SPI Agent Designation

A SPI Agent Certificate will be issued to each SPI agent who completes all required training.

Table C-1. SPI Agents Software Engineering Training Matrix

Course Name	SPM	SME / SPIRIT	Overview of CMM	SCE	SCE Overview	Peer Reviews	Accelerating Change/ Equivalent	High Performance Organizations	Microsoft Project	Guidelines for Successful Teams	SPI Certificate Issued
Taught By	SEPO	SEPO	various	ISD	various	SEPO	IMA	SSC	New Horiz.	SEPO	-
Hours	40	8	2-24	40	2	4-6	24	24	24	4	-
SPI Agents	X	X	X	X (either)	X	X (either)	O	X	-	-	-
202-Pohoski, Mike	12/98	3/93	SPI	N/A	Aug-00	Dec-98	N/A	Apr-99	optional	Aug-00	8/28/00
212-Forbes, Dave		10/99					N/A	10/98	optional	9/02	
212-Groarke, Brian	4/92	2/99	9/94	3/96	N/A	4/92	2/97	2/99	2/96	8/00	8/28/00
212-Leef, Callie	9/98	10/99	SPI	N/A	8/00	9/98	4/00 Eq	N/A	10/99	11/00	11/16/00
212-Pham, Cynthia	10/00	5/00	1/02	N/A	8/00	10/98	N/A	5/01	optional	10/00	1/10/02
212-Reyna, Joe	9/98	5/99	11/98	11/98	N/A	9/98	N/A	4/99	10/99	8/00	8/28/00
212-Roberts, Michelle	2/00	12/98	SPI	N/A	8/00	7/00	4/00 Eq	N/A	10/99	8/00	8/28/00
212-Robertson, George	4/94	3/93	9/94	N/A	8/00	4/94	4/00 Eq	N/A	10/99	8/00	8/28/00
212-Wells, Jim	3/96	2/99	SPI	N/A	8/00	3/96	2/97	12/00	10/99	8/00	8/28/00
212-Windhurst, Bill	11/92	7/99	6/99	3/96	N/A	11/92	2/97	9/99	10/99	8/00	8/28/00
230-Titus, George	10/00	9/00	1/01	N/A	8/00	11/00	N/A	4/00	optional	8/00	4/25/01
230-Fieser, Fran	5/01	9/00	1/01	N/A	2/02	11/00	N/A	4/00	optional	11/00	2/4/02
240-Craven, Lillian	1/92	N/A	8/00	N/A	8/00	1/92	N/A	7/99	optional	8/00	8/28/00
240-Hupp, Nancy	2/01	11/00	1/01	N/A	2/02	11/01	N/A	6/99	optional	11/00	2/4/02
240-Moser, Mike	4/92	2/99	9/94	3/96	N/A	4/92	2/97	7/98	10/99	8/00	8/28/00
240-Van Densen, Sandy	4/00	7/02					N/A	5/01	optional	9/02	
260-Mora, Jorge	12/98	2/99	SPI	N/A	8/00	2/00	N/A	11/99	10/99	10/00	10/5/00
270-Iffla, Brandon	5/02					6/02			optional		
280-O'Leary, Kevin	1/92	12/98	9/94	N/A	8/00	1/92	N/A	3/00	10/99	8/00	8/28/00
280-Anderson, Teresa	7/93	11/01	1/02	N/A	2/02	4/97	N/A	9/01	optional	12/01	2/4/02

Legend for Category Title: X = Required course; O = Optional

Legend for Individuals: date or √ = training completed
N/A = not applicable/not required
SPI = Satisfied CMM training in SPI Agent meetings
(blank) = Training needed; schedule in Section 6.2

APPENDIX D. INSTRUCTOR TRAINING PLAN

D.1 Skills Needed

The SSC San Diego Software Engineering Training Plan calls for the following abilities for Instructors:

- Understand the roles and responsibilities of software personnel
- Understand the structure and uses of the Capability Maturity Model and process improvement
- Demonstrate skills and knowledge to perform training activities
- Prepare and present training courses in software engineering topics.

D.2 Training Requirements

The following courses apply to instructors:

- Software Project Management (required)
- Train the Trainer (required)
- Training Program Personnel Orientation in TP Process (reference e) (required)
- Software Capability Evaluation (optional)

D.3 Training Records

Training requirements and dates completed for current Instructors are shown in Table D-1.

Table D-1. Instructor Training Matrix

Course Name	SPM	Train the Trainer	Training Personnel Orientation	Software Capability Evaluation
Taught By	SEPO	SEPO	SEPO	ISD
Hours	40	8	1	40
Instructors	X	X	X	O
Groarke, Brian	4/92	3/93	8/00	3/96
Leef, Callie	9/98	W-9/00	3/00	
Moser, Mike	4/92	3/93	8/00	3/96
Olson, Alan	10/91	3/93	8/00	3/96
Pham, Cynthia	10/00	W-3/02	2/02	
Reyna, Joe	9/98	W-11/98	8/00	11/98
Riegle, Bryan	12/93	W-10/98	9/00	
Robertson, George	4/94	10/93	9/00	
Sampson, Charlie	11/99	W-10/98	8/00	
Wells, Jim	3/96	W-10/98	8/00	
Windhurst, Bill	11/92	W-9/00	3/00	3/96

Legend for Category Titles: X = Required course O = Optional

Legend for Individuals: (date) or ✓ = training completed
 W = Waiver approved
 (blank) = Training needed